

the whole coast. Abundant, both alive and dead; fragile, white and beautiful.

*Mulinia gaudeloupenensis* Recluz. Single valves on the shore at Wounta Haulover.

(*To be continued.*)

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#### NEW VARIETIES OF NORTH AMERICAN PISIDIA.

BY V. STERKI.

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During the twelve years' study of our *Pisidia*, on about 350,000 specimens examined, many new forms were found. Some of them have been published from time to time, since 1895, in the NAUTILUS, others were held back, mostly for years, in the hope of getting additional materials which would more clearly show their relations and positions. Owing to the great variation of most of our species, with some apparently endless, it is often difficult to know, or even to estimate, whether a new *Pisidium* represents a new species, or a variety, and it seemed preferable to be rather over-cautious with regard to "n. sp." than too hasty. Yet new forms, more or less different from those published or regarded as typical for a species, should be named and described, and short descriptions of a number of such are offered in the following lines. They are ranged under species already known, as varieties, in many instances with some doubts, leaving it for further evidence to prove their real affinities or their claims to representing distinct species. A few short notes are necessarily added, but a more detailed discussion of the affinities etc., of the various species and forms is left for a forthcoming revision of our *Pisidia*.

*Pisidium idahoense* Roper var. *indianense* n. Smaller than the types, less inflated; beaks much narrower, low, little prominent over the hinge margin; surface with several well-marked lines of growth, more horn-colored than in the other forms; shell and hinge slight, the right cardinal tooth less curved; long. 8, alt. 7, diam. 4 mill.

Hab.: Lake Maxinkurkee, Ind., collected in considerable numbers by Drs. Evermann and Bartsch, for the U. S. Fish Commission.

As compared with the types from Idaho and the larger, much inflated form from Seattle, Washington, the Indiana *Pisidium* appears to be of a distinct species. Yet a form, eventually a var., from

Lake Michigan: Charlevoix (Walker) and the South end (Daniels) is somewhat intermediate, although more like the Idaho form, and so it appears to be safer to regard the above as a variety of the same species for the present.

*Pisidium compressum* Pr., is very variable, but a number of its forms and varieties are characteristic and rather constant. As typical is accepted the common river and creek form: beaks high, narrow, with well developed appendages, above which there are small flattened or even impressed smoothish areas, usually with more or less distinct radial lines; balance of the surface with rather coarse, sharp, regular, concentric striæ, dull, with microscopic wrinkles, color whitish to grayish, and often there are marginal zones of straw to yellow color, with more shallow, irregular striæ, more or less shining; shell and hinge stout, with whitish nacre.

Var. *opacum* n. In shape and size near the typical form, well inflated, but the surface is finely and irregularly striate, dull to shining, color often plumbeous above; beaks with the appendages slighter, or merely flattened on top; shell and hinge stout, the former opaque.

This is a form of sloughs, ditches, pools, etc., along rivers and creeks, quiet places in such, with muddy bottom, also of lakes and ponds near inlets; it seems to be a retrograde one, with respect to the surface sculpture, and it is notable that also the young in such places have the fine, obsolete striæ.

Var. *lævigatum* n. Moderately oblique, of medium to rather large size, generally well inflated; beaks less elevated, rounded or more or less flattened on top with slight or obsolete ridges; surface with fine, irregular striæ to nearly smooth, more or less shining; color light to dark horn; shell slight, translucent, nacre, more glassy; hinge slight, generally less angular than in the type.

Widely distributed, in quiet waters. These mussels often have considerable resemblance, in shape, with *Pis. variable* Pr. (which is variable on somewhat corresponding lines), and it is sometimes very difficult to distinguish dead or fossil specimens of the two, and even fresh shells of certain forms.

Var. *limnicolum* n. Near *lævigatum*, but much smaller, some specimens have ridges or well-formed appendages on the beaks; shell and hinge slight, cardinal teeth well formed. A form of deeper, quiet water, lakes, etc. Hundreds of specimens at all stages

of growth were collected in the Fox River, Wisconsin, by the late Geo. T. Marston.

Var. *rostratum* n. Of medium size, moderately to rather well inflated, oblique, outlines slightly angular; beaks little prominent, rounded or with slight ridges around the slightly flattened central areas; angles at scutum and scutellum well projecting, slightly rounded, especially at the latter, the projecting part of the mussel is somewhat rostrum-like, pinched, surface with fine, irregular striæ, somewhat glossy; color pale to yellowish or brownish-horn, shell rather thin, translucent, hinge slight, with the teeth small but well formed.

The typical form (of the var.) from Reed Lake (Dr. Kirkland), Blue Lake, and other waters in Michigan, Clear Lake, Indiana (Daniels).

Var. *arrosum* n. Rather small and low, not very oblique, outlines somewhat angular, moderately inflated, beaks not much elevated, narrow, rounded or slightly flattened on top, without appendages, and with barely any radial lines; surface with very fine striæ above, becoming somewhat more distant and irregular towards the margins, slightly shining, color pale to yellowish or reddish-horn, shell thin, somewhat translucent, hinge slight.

Michigan: Grand Rapids in several lots (Streng, Kent Scient. Inst.), Blue Lake, Allegan Co. (Dr. Kirkland), Brooks Lake, Newaygo Co. (Streng), Green Creek, Allegan Co. (Walker). A peculiarity of this rather constant form is a disease found on the shells of almost all specimens: small white spots of erosion gradually becoming confluent and extending over a large part of the surface.

Var. *confertum* n. Of medium size, somewhat oblique, well and compactly inflated; beaks broad, not much prominent, slightly flattened on top, or rounded, without appendages; upper margin moderately curved, with projecting angles where passing into the supero-anterior and posterior slopes which are well marked, rather long, straight, the former steep, the latter nearly perpendicular; scutum and scutellum marked in some specimens; surface with irregular, slight striæ and lines of growth, dullish to slightly shining; color straw to yellowish, reddish or brownish-horn, generally with irregular, lighter and darker, concentric zones; shell rather stout, slightly translucent, nacre whitish, muscle insertions well marked, hinge moderately stout, as compared with typical *compressum*, median

part (plate) rather long and slightly curved; cardinal teeth small and rather defective,<sup>1</sup> of the right, the posterior end is small, simple, the anterior small, low and nearly obsolete, the left anterior short, somewhat massive, the posterior oblique, short, slight and not projecting over the level of the valve-edge, lateral teeth at strong angles to the plate, the right ones little elevated, the cusps of the left rounded; ligament stout, covered in younger, partially or quite uncovered in adult specimens.

Size: long. 4, alt. 3.8, diam. 2.8 mill. (average).

Habitat: Blue Lake, Muskegon co., Michigan, collected by Dr. Kirkland, in good numbers, remarkably uniform.

This is certainly a remarkable form, and has rather the significance of a species, yet seems to be connected with other forms of *P. compressum*.

Var. *coosaense* n. Of medium size, straw to light horn colored; in shape near the typical form, with rather posterior, narrow, elevated beaks bearing appendages; superior margin somewhat less curved and rather long, the supero-anterior slope somewhat more remote from the beaks; surface with fine to very fine striae, dull to slightly shining. Shell and hinge rather strong.

Hab.: Georgia and Alabama, along the Coosa river (collected by Smith, sent by B. Walker).

In younger to two-thirds grown specimens, the features of this form are especially well marked: the outlines rather angular, all margins little curved, while full-grown examples are approaching the typical form, except as to surface sculpture.

Var. *contrarium* n. Of medium size, well inflated, moderately oblique; outlines various from near those of *coosaense* and the typical form, though less angular, to rounded, nearly oblong or oval, with only the supero-anterior slope more or less marked; beaks generally less posterior, moderately elevated, rather narrow, with a small, more or less flattened area on top, and a slight ridge or even small appendage; surface with rather fine, crowded, sharp, regular striae, dull; color pale to grayish horn, often with a light zone along the margins; shell and hinge rather stout. This *Pisidium*, although rather variable in itself, and probably connected with other forms, marks an interesting contrast to *coosaense* as well as to the type, and *laevigatum*, etc.

Alabama: Attalla, Calera, Ebenezer Church, Montevallo. (Smith collected, B. Walker sent.)

Var. *smithii* n. Of rather good size, little inequiptartite, somewhat oblique, moderately to rather well inflated, more so near the beaks, while the lower parts of the disks are rather flat; outlines rather angular, with the angles more or less rounded, superior and inferior margins moderately curved, the superior rather long; supero-anterior slope nearly straight, steep, posterior part subtruncate; beaks not

<sup>1</sup> In several specimens examined.

much behind the middle, prominent, rather narrow, more or less flattened on top, with ridges or slight appendages; surface with rather crowded, sharp, regular striae, dullish; color from light horn, in the younger, to brownish; light chestnut in adult specimens.

Hab.: Shoal creek, Alabama (Hinkley).

This form is mainly characterized by its beaks being less posterior than in most others, and, as it seems, by its brownish color.

The above are a few of the more marked forms of the very polymorphous *P. compressum* Pr. More have been noticed, and some of them will probably also have to be named and described; besides, more will be brought up with new materials.

*Pisidium fallax* Sterki var. *mite* n. Rather smaller than the typical form, beaks without appendages, or slightly flattened on top; shell and hinge slighter.

Hab.: Grand river, Michigan (Dr. Kirkland), Nimishillen creek, Canton, Ohio (Sterki).

Var. *errans* Sterki. Has been published as var. *septentrionale* Sterki. (The NAUTILUS, XII., p. 78.) The name, being pre-occupied,<sup>1</sup> had to be changed. This well-characterized *Pisidium* has been seen from northern Maine, northern Michigan, Minnesota and Keewatin. (McInnes Col., Whiteaves sent.)

*Pisidium punctatum* Sterki var. *armatum* n. Higher, and often larger, than the typical form, beaks very prominent, with strong appendages, which give the mussel quite a different shape and appearance.

Hab.: Tuscarawas river, Ohio (Sterki), and other places.

Var. *simplex* n. Beaks without appendages, rounded or slightly flattened on top; striation slighter; mussel sometimes smaller than the typical form.

Hab.: Joliet, Illinois (Ferriss, Handwerk), Carp Lake near Mackinaw, Michigan (Walker), Fox River, Wisconsin (Marston).

(To be continued.)

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#### GENERAL NOTES.

MASSACHUSETTS SLUGS.—I am indebted to Mr. John Ritchie, Jr., for two lots of slugs collected in the vicinity of Boston. The first lot included *Arion subfuscus*, Draparnand, of the form called *cinereo-fuscus*, Drap., and *Limax maximus*, L., of three forms, the first nearly typical, the second var. *obscurus*, Moquin-Tandon, and the third var. *cellarius*, Moquin-Tandon. A series received to-day, collected by Mr. Abner Hatfield at Jamaica Plain, includes *A. subfuscus*, v. *cinereo-fuscus*, *L. maximus* and *Agriolimax agrestis*. The *A. agrestis* unfortunately are dead and somewhat spoiled, but they are of the dark and reddish forms, not the very pale kinds so common in England. I was glad to confirm the Boston *Arion* as *A. subfuscus*.

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<sup>1</sup> T. Prime, Cat. of 1895, "undescribed."